

DOCKET FILE COPY ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

RECEIVED

NOV 20 1995

In the Matter of)
)
ADVANCED TELEVISION SYSTEMS)
AND THEIR IMPACT UPON THE) MM Docket No. 87-268
EXISTING TELEVISION BROADCAST)
SERVICE)

To: The Commission

COMMENTS OF
MT. MANSFIELD TELEVISION, INC.

Mt. Mansfield Television, Inc. ("Mt. Mansfield"),
the licensee of WCAX-TV, Channel 3, Burlington, Vermont,
respectfully submits the following comments in response to the
Commission's Fourth Further Notice of Proposed Rulemaking and
Third Notice of Inquiry in this proceeding.^{1/}

As depicted on the map included with the attached
engineering statement, WCAX-TV is a CBS affiliate that currently
provides predicted Grade B service to the northern two-thirds of
Vermont, as well as to significant portions of surrounding areas
in upstate New York and New Hampshire.^{2/} As the Commission
recognizes, "Broadcast television has become an important part of

^{1/} FCC 95-315 (released Aug. 9, 1995) ("Third NOI").

^{2/} Through its ownership of translators, WCAX also
provides over-the-air service to the areas surrounding Bellows
Falls, Bennington, and Rutland in southern Vermont.

10/20/95

the fabric of our society by making available . . . a vast array of programming, including news, public affairs, educational, and entertainment programming." Third NOI ¶ 22. For over 40 years, Mt. Mansfield has provided award-winning coverage of events of local concern that the residents of Vermont and the surrounding area have consistently relied upon as their preferred source of local news.^{3/}

Apart from its concern about the Commission's need to expedite Canadian coordination on ATV matters, Mt. Mansfield confines these comments to two issues addressed in the Third NOI: (1) "which parts of the VHF and UHF bands are most highly valued for broadcast use (e.g., VHF, lower UHF, middle UHF, upper UHF)"; and (2) "the costs associated with placing television in each of the four possible locations." Third NOI ¶ 86. These issues are particularly important to the Commission's goal of preserving the "critical national medium and resource"^{4/} of over-the-air broadcast reception for viewers in mountainous areas such as Vermont.

Mt. Mansfield applauds the Commission's decision to revisit its earlier tentative decision to confine ATV service

^{3/} Since February of 1990, WCAX's share of the DMA during the broadcast of its local news (6-7 p.m., Monday through Friday) has ranged from 41% to 32% and averages 35%. Source: Nielsen Station Index.

^{4/} Third NOI ¶ 11.

largely to the UHF spectrum. That decision should be made on the basis of the benefits to the public from continued reception of broadcast television service, as described below. To the extent that the Commission's allocation decision relies instead upon the prospect of repacking to obtain greater auction revenues, it is open to serious legal challenge. Whether or not VHF spectrum is more attractive than UHF spectrum to other potential users, Congress has prohibited the Commission from considering potential auction revenues in determining whether assignment of a particular band would be in the "public interest, convenience and necessity." 47 U.S.C. § 309(j)(7)(A).

It is well recognized that the propagation characteristics of VHF frequencies enable those signals to reach areas of rugged terrain that UHF frequencies cannot. Another channel 3 licensee, public station WPSX-TV, Clearfield, Pennsylvania, has already noted at an earlier stage of this proceeding that central Pennsylvania, for example, contains many population centers in river valleys that could not be reached by UHF facilities even operating from a higher plateau.^{5/} As discussed further in the attached engineering statement, lower frequency bands are capable of greater diffraction or "bending" around obstructions in the terrain. Moreover, broadcasting in ATV rather than NTSC format does not ameliorate this disparity or

^{5/} Comments by WPSX-TV, Channel 3 (October 8, 1992).

otherwise improve the signal's ability to reach receivers obstructed by mountains.^{6/} For these reasons, broadcast in the VHF band remains vital in order to reach viewers in mountainous terrain.

The UHF handicap is particularly acute in the state of Vermont. Attached is a shaded relief view of the WCAX-TV coverage area. As it demonstrates, that area is dominated by the spine of the Green Mountains, whose peaks range from 2,000 to 4,000 feet. Even though the WCAX transmitter is located on the highest of these peaks, shadowing seriously affects a number of the larger population centers in the state that are located in mountain valleys. These include Montpelier -- the state capital -- as well as Middlebury, Barre, and St. Johnsbury. Because WCAX-TV now broadcasts on channel 3 in the lower VHF range, this shadowing effect is minimized. UHF would not adequately cover these important population centers.

A graphic illustration of the problems of UHF propagation in rugged terrain is provided by a comparison of the metro area and DMA ratings of WVNY(TV), the ABC affiliate in

^{6/} The HDTV Grand Alliance has successfully transmitted ATV on UHF in testing in Charlotte, North Carolina. As discussed further in the attached engineering statement, however, the rolling terrain of Charlotte is widely different from the mountainous terrain in WCAX-TV's coverage area. Accordingly, the Charlotte tests are incapable of predicting whether former NTSC viewers in mountainous regions will receive an ATV signal broadcast on the UHF band.

Burlington operating on channel 22. Like WCAX, WVNY transmits from the highest point in the state of Vermont, but at a much higher power (1000 kW vs. 37.8 kW ERP).

In this market, the Nielsen surveys are conducted over a continuous four week period, four times each year, in February, May, July and November. Viewing is always at a maximum in the February surveys. In each case, some 400 households are sampled to determine what percent of the audience has watched each of the programs offered by the television stations serving the area. The audience in the core "Metro" area (Chittenden, Grand Isle, Franklin, Clinton and Essex counties) is separately reported. In addition to reporting the percentage watching individual programs, the data are aggregated to show average cumulative audiences over the entire four week period. This cumulative audience, which counts every household that watched any program on a station for more than 15 minutes, has always been seen as a reasonable approximation of how many can watch.

The table below presents the results of five February Nielsen surveys for WCAX and WVNY over the past six years measuring the cumulative audience from 9 a.m. to midnight, Sunday through Saturday for four consecutive weeks (1992 data not available):

<u>YEAR</u>	<u>WCAX</u>		<u>WVNY</u>		<u>HOUSEHOLDS (thousands)</u>	
	<u>DMA%</u>	<u>METRO%</u>	<u>DMA%</u>	<u>METRO%</u>	<u>DMA</u>	<u>METRO</u>
1990	84	93	49	78	275	105
1991	83	95	48	77	278	106
1993	79	92	48	76	292	109
1994	89	97	42	67	283	110
1995	82	92	48	74	284	111
<u>AVERAGE</u>	83.4	93.8	47	74.4	282.4	108.2

Using these cumulative ratings as a rough measure of signal reach, they show that WVNY's percentage of audience is substantially higher in the relatively-flat terrain of the metro area as compared with the whole DMA, rising from 47% to 74.4%. WCAX's percentage is also higher in the metro area, rising from 83.4% to 93.8%, but this rise is not nearly as dramatic as that of WVNY.

Comparing these measures of the UHF reach of WVNY with the VHF reach of WCAX throughout the entire DMA also shows dramatic differences. WCAX reaches 83.4% of 282,400 households throughout the DMA, or 235,522. In stark contrast, WVNY reaches only 47% of these DMA households, or 132,728. Thus, the UHF station is able to reach only about 56% of the households reached by the VHF station (or about 100,000 fewer) -- even though the

UHF power is 1,000 kW while the VHF power is only 37.8 kW.^{7/}

A review of WCAX's coverage in the table of allotments, proposed as a starting point in January 1995 by the Association for Maximum Service Television, Inc. ("MST") and various other broadcasters, further demonstrates the UHF handicap in rugged terrain. MST's table notes that WCAX-TV's current signal, transmitted in NTSC format on Channel 3, serves a population of approximately 693,000.^{8/} However, the signal would reach only about 553,000 people if transmitted in ATV format on Channel 38. Thus, to preserve the public interest benefits long associated with WCAX's local informational programming as relied

^{7/} It is possible, of course, that programming preferences may affect these data -- although that factor is minimized by reliance on cumulative rather than audience share data. While the metro area is relatively free from shadowing terrain, WVNY still reaches only about 79% of the audience of WCAX in the metro area (74.4/93.8). Even if this 79% discount might be viewed as a program preference, however, it does not make for a significant difference in the results. The outside-metro coverage WVNY is its total coverage (132,728), less its metro coverage (80,501), or 52,227. Adjusting both of these numbers for a presumed program preference of 79% would lead to an outside-metro coverage for WVNY of only 66,110. The comparable outside-metro figure for WCAX is its total coverage (235,522) less its metro coverage (101,492), or 134,030. Thus, even with a 79% discount for presumed program preference, in the area outside the metro the UHF station reaches about 68,000 fewer households.

The minimal effects of program preferences on the data cited above can also be documented by comparing WVNY's primetime ratings in the metro area with those ratings for the DMA as a whole, which are consistently 50-100% lower. TvSCAN Trender, TvSCAN Ratings Analysis System, 1995 (July 1993 - July 1995; data from Nielsen).

^{8/} Appendix B, Broadcasters' Proposed ATV Allotment/Assignment Approach, filed January 13, 1995, at p. 42.

upon by residents of its service area, a VHF assignment for ATV service will be critical.^{9/}

The Commission has also solicited comment on the additional costs of providing ATV service on UHF frequencies. These costs are substantial. To reach even a reduced population, MST's proposal would require Mt. Mansfield to transmit at 955 kW. As noted in the attached engineering statement, it would be extraordinarily expensive to construct and operate such facilities. The additional capital costs for higher power transmission equipment would be approximately \$1,500,000 -- three times the cost of VHF equipment necessary to transmit ATV. The additional monthly electricity costs of operating at this higher power would be approximately \$5,600 -- nearly five times that required to transmit ATV on VHF.

Finally, it is critical that the Commission not propose any table of allotments until it has determined that the U.S. ATV system will not conflict with Canada's plans for ATV.^{10/}

^{9/} As noted above, WCAX also currently relies upon translators to reach the obstructed areas of southern Vermont. It does not appear that the Commission plans to assign ATV spectrum to translators. See 57 Fed. Reg. 53588, 53591 (1992). In light of the anticipated loss of translator coverage in the ATV regime, effective replication of WCAX's principal signal is thus even more critical.

^{10/} As a U.S. station with significant Canadian audience, Mt. Mansfield also strongly urges the Commission to coordinate with Canada in the selection of the Grand Alliance or any other system. Failure to coordinate the selection of HDTV transmission system with Canada may lead to Canadian viewers switching to ATV

As MST's proposal acknowledges, Canadian ATV allotments may require changes to the proposed table of allotments.

Broadcasters and manufacturers will be able to make ATV a reality only if they are able to plan their facilities with the assurance that international coordination will not later result in fundamental changes in the Commission's allocation and assignment scheme.

receivers that are incapable of receiving signals from U.S. stations.

CONCLUSION

Mt. Mansfield requests that the Commission give special consideration to assigning VHF frequencies for ATV service to stations providing service in areas of mountainous terrain. Additionally, the Commission should coordinate its spectrum allotment and other ATV decisions with Canada as promptly as practicable.

Respectfully submitted,

MT. MANSFIELD TELEVISION, INC.



William R. Richardson, Jr.
Gregory R. Firehock

WILMER, CUTLER & PICKERING
2445 M Street, N.W.
Washington, D.C. 20037
(202) 663-6000

Its Attorneys

November 20, 1995

Station WCAX-TV • Channel 3 • Burlington, Vermont

Statement of Robert D. Weller, Consulting Engineer

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained by Mt. Mansfield Television, Inc. to evaluate the effects of the potential conversion from NTSC operation on VHF TV Channel 3 to ATV operation on a UHF or VHF TV Channel.

Background

Mt. Mansfield Television, Inc. has been licensed since 1954 to operate Station WCAX-TV, Channel 3, Burlington, Vermont. WCAX-TV operates from a transmission site atop Mt. Mansfield, east of Burlington, and provides service to the northern two-thirds of Vermont, as well as to portions of New Hampshire and New York. The Grade A and Grade B coverage contours have been calculated in accordance with the Commission's Rules and are shown in the attached Figure 1.

Comments Concerning Grand Alliance Field Tests

I have reviewed the Field Test Results of the Grand Alliance HDTV Transmission Subsystem, dated September 16, 1994, prepared by the Association for Maximum Service Television Inc., *et al.*, (the "Report") which is on file with the Commission. I am generally familiar with the terrain conditions in the Charlotte, North Carolina, area where the testing described in the Report was conducted. The terrain in that area can be described generally as "rolling." I am also generally familiar with the terrain conditions in the service area of WCAX-TV. The terrain in much of that area is described generally as "mountainous." It is my opinion that the two areas are significantly different in terms of terrain.

It is well known that a transmission path that is obstructed by intervening terrain can still provide a usable signal, even though the terrain shields the receiver from the transmitter. Such propagation is typically produced by *diffraction* of the radio waves over the intervening terrain. Diffraction means the "bending" of a wave around an object. For radio waves of longer wavelength (*i.e.*, lower frequency), the diffraction is greater. Therefore, diffracted waves are used extensively (sometimes inadvertently) in the VHF and lower frequencies to provide service to receivers located in valleys and other areas that are otherwise shielded from line-of-sight service. Because the diffraction angle is less at higher frequencies, the diffraction propagation mode is of considerably less utility at UHF frequencies.

HDTV channel characterization studies conducted in Denver and San Francisco (both with nearby mountainous areas) by the National Telecommunications and Information Administration (NTIA)

Station WCAX-TV • Channel 3 • Burlington, Vermont

found that destructive interference due to multipath reflections (“ghosting”) could be problematic, and that multipath propagation was more prevalent at UHF than at VHF. Multipath reflections add to the effective noise level at a receiving location, effectively reducing the reliability of service at that location.

For the reasons discussed above, signals transmitted at VHF frequencies tend to produce substantially better coverage in mountainous regions than do signals transmitted at UHF frequencies. The inherent coverage advantage at VHF is true regardless of the type of signal being transmitted (*e.g.*, NTSC or ATV). Because of the widely different terrain between North Carolina and Vermont, it is my opinion that the Charlotte tests do not sufficiently predict the suitability of transmission of the Grand Alliance system at UHF frequencies for broadcast stations located in mountainous areas.

Economic Factors Associated with ATV Conversion

There are substantial capital and recurring costs associated with the proposed conversion from NTSC to ATV operation. These costs are particularly great for broadcasters presently operating NTSC facilities on low-VHF channels, which may be required to operate ATV facilities on UHF channels. This is due to the “UHF penalty,” described below.

Although the *average* power associated with the Grand Alliance ATV system is relatively low when compared to that of an NTSC system, use of a higher frequency channel (*i.e.*, UHF) for transmission requires that the service range for UHF equipment can be made equal to that in the VHF band only by using additional power in direction proportion to the square of the frequency. This is a consequence of the frequency dependence of basic transmission loss between the transmitter and receiver.

For example, it has been suggested in the table of allotments contained the Broadcaster’s Proposed ATV Allotment/Assignment Approach, filed with the Commission by the Associated for Maximum Service Television Inc., *et al.*, on January 13, 1995 (“MST Proposal”), which I have reviewed, that the Commission should assign Channel 38 to WCAX-TV for ATV use. The MST proposal specifies an average effective radiated power of 954.6 kW at the UHF frequency for coverage equivalent to the WCAX-TV Channel 3 NTSC facility. Transmission at this power level using a high-gain commercially available antenna (gain of 30), and assuming reasonable transmission system losses, would require a transmitter capable of about 35 kW average power. Assuming a peak-to-average ratio of 7 dB for relatively distortion-free transmission of the Grand

Station WCAX-TV • Channel 3 • Burlington, Vermont

Alliance system, a transmitter capable of 175 kW peak power would be required. Such a transmitter would be expected to cost about \$1,300,000.

On the other hand, if ATV operation were conducted in the low-VHF band, a transmitter of only about 30 kW peak power would be required. This transmitter would be expected to cost about \$400,000 -- one-third the cost of the UHF transmitter. The high-gain UHF transmitting antenna would be expected to cost about \$200,000, which is twice the cost of the simpler low-gain transmitting antenna that would be required at VHF. Thus, transmission of ATV on Channel 38, as opposed to ATV transmission on a VHF channel, would require an additional capital investment of about \$1,000,000.

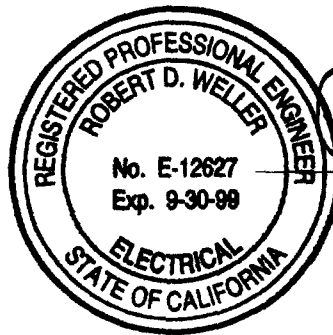
Assuming an average electric cost of 12¢ per kilowatt-hour, and typical overall efficiencies of 43% and 54% for VHF and UHF transmitters, respectively, the VHF ATV transmitter would cost about \$1,200 per month to operate, while the UHF ATV transmitter would cost about \$5,600 per month to operate. Thus, a UHF ATV plant has recurring electric costs about 4.7 times those of an equivalent (in coverage) VHF ATV plant.

List of Figures

In carrying out these engineering studies, the following attached figure was prepared under my direct supervision:

1. Coverage contours of WCAX-TV.

November 14, 1995




Robert D. Weller, P.E.



HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

Affidavit

State of California |
County of Sonoma | ss:

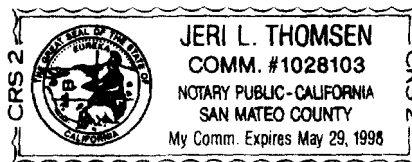
Robert D. Weller, being first duly sworn upon oath, deposes and says:

1. That he is a qualified Registered Professional Engineer, holds California Registration No. E-12627 which expires September 30, 1999, and is employed by the firm of Hammett & Edison, Inc., Consulting Engineers, with offices located near the city of San Francisco, California,
2. That he graduated from The University of California, Berkeley, in 1984, with a Bachelor of Science degree in Electrical Engineering and Computer Science, was an electronics engineer with the Federal Communications Commission from 1984 to 1993, with specialization in the areas of FM and television broadcast stations, cable television systems and satellite systems, and has been associated with the firm of Hammett & Edison, Inc., since June 1993,
3. That the firm of Hammett & Edison, Inc., Consulting Engineers, has been retained by Mt. Mansfield Television, Inc. to evaluate the effects of the potential conversion from NTSC operation on VHF TV Channel 3 to ATV operation on a UHF or VHF TV Channel,
4. That he has carried out such engineering work and that the results thereof are attached hereto and form a part of this affidavit, and
5. That the foregoing statement and the report regarding the aforementioned engineering work are true and correct of his own knowledge except such statements made therein on information and belief and, as to such statements, he believes them to be true.

RD Weller

Robert D. Weller, P.E.

Subscribed and sworn to before me this 14th day of November, 1995



Jeri L. Thomsen

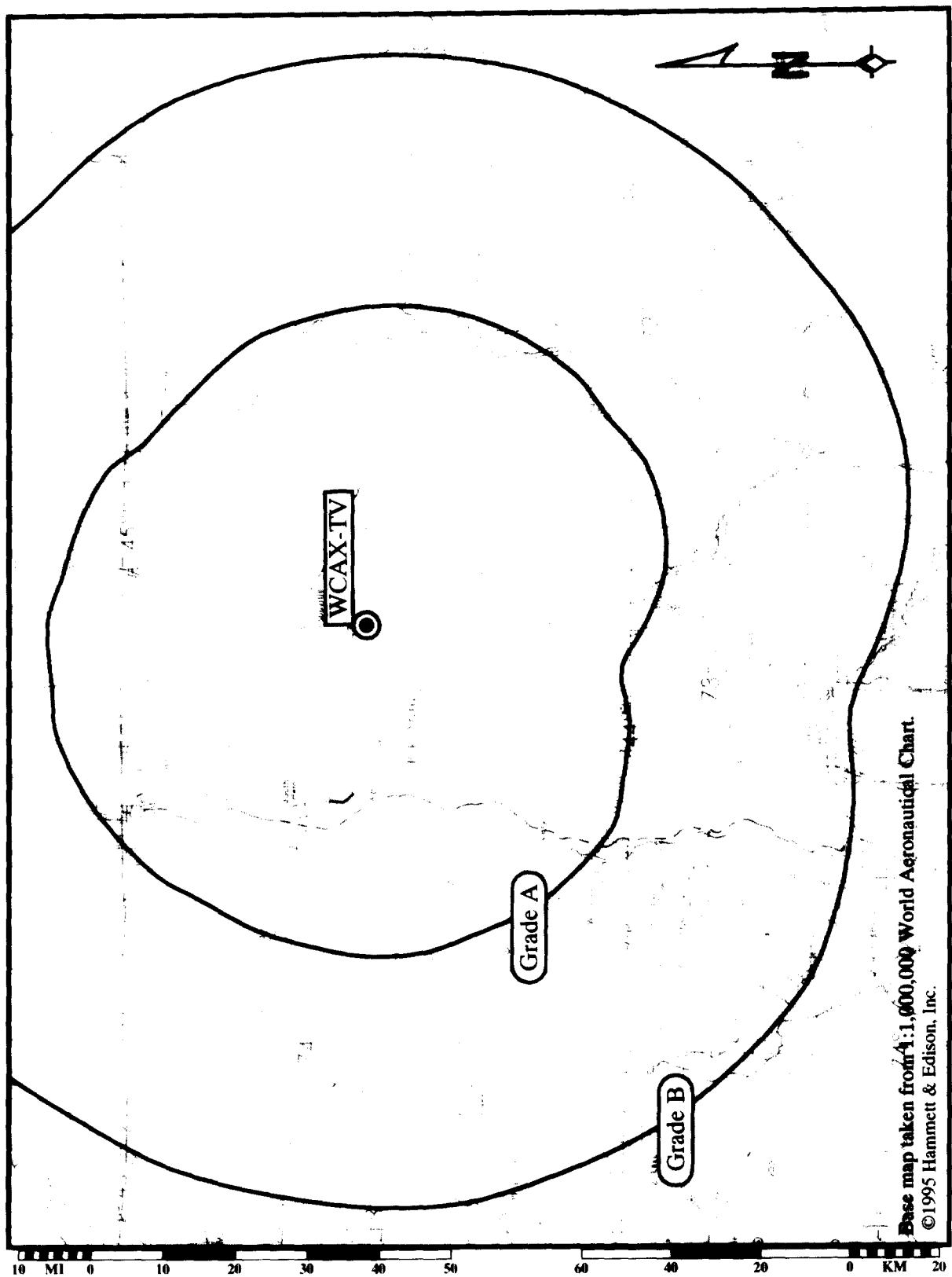


HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

951115
Affidavit

Station WCAX-TV • Channel 3 • Burlington, Vermont

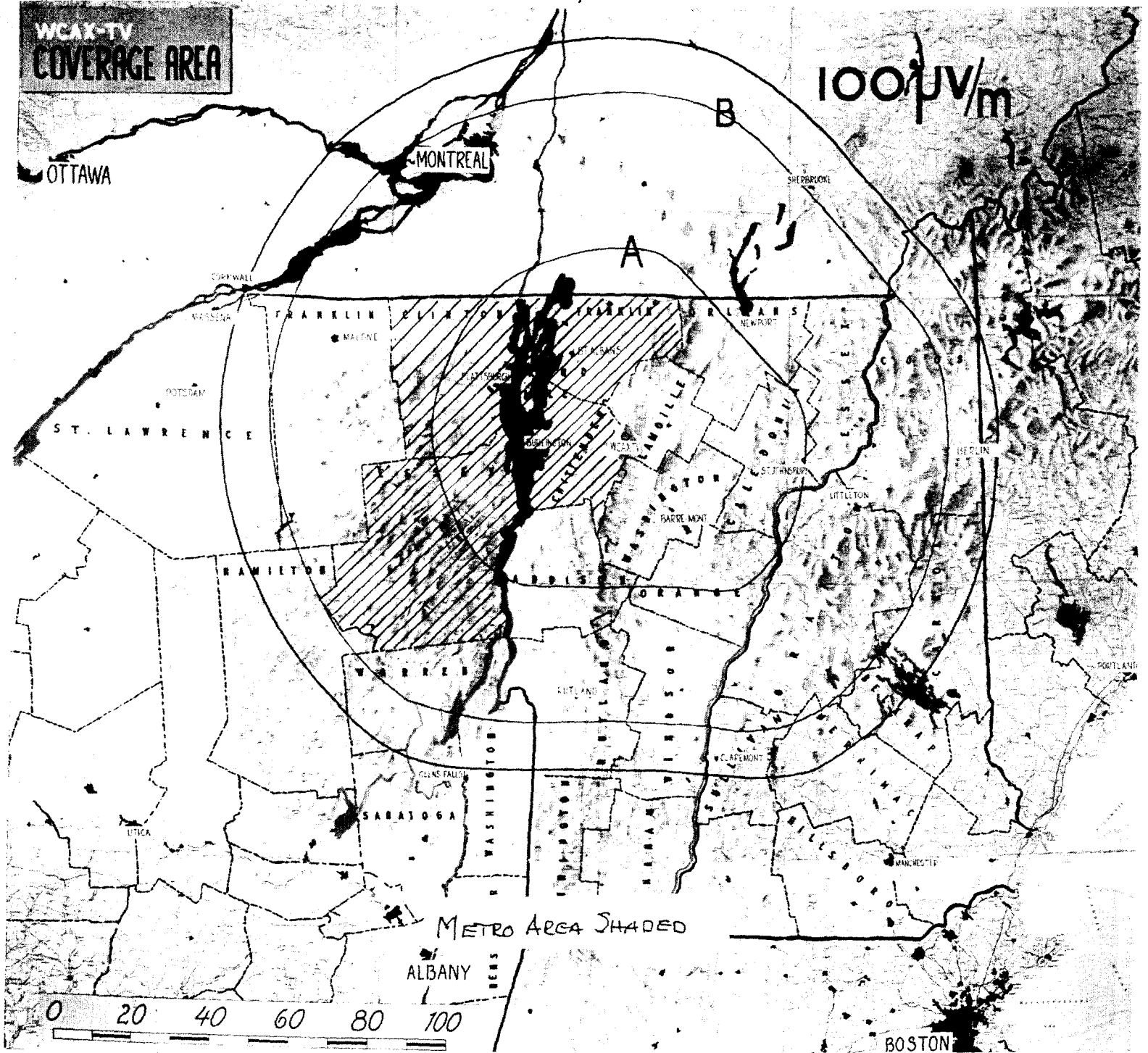
Calculated Coverage Contours



HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

951115
Figure 1

**WCAX-TV
COVERAGE AREA**



CERTIFICATE OF SERVICE

I, Gregory R. Firehock, hereby certify that I have this 20th day of November, 1995, caused to be delivered by hand, the foregoing Comments of Mt. Mansfield Television, Inc., to the following persons:

Federal Communications
Commission

Saul T. Shapiro
Federal Communications Commission
Mass Media Bureau
Assistant Chief, Technology Policy
1919 M Street, N.W.
Room 310
Washington, D.C. 20554

Roger Holberg, Esq.
Federal Communications Commission
Mass Media Bureau
Policy and Rules Division
2000 M Street, N.W.
Room 545
Washington, D.C. 20554

International
Transcription Service

ITS
2100 M Street, N.W.
Suite 140
Washington, D.C. 20037



Gregory R. Firehock